

UN Decade of Ocean Science for Sustainable Development

Engagement of the UK Marine Science Community

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**NOC Associating Meeting
9th May 2019**

The Decade is coming



2021
2030

United Nations Decade
of Ocean Science
for Sustainable Development

The Decade

“The ocean science we need for the future we want”

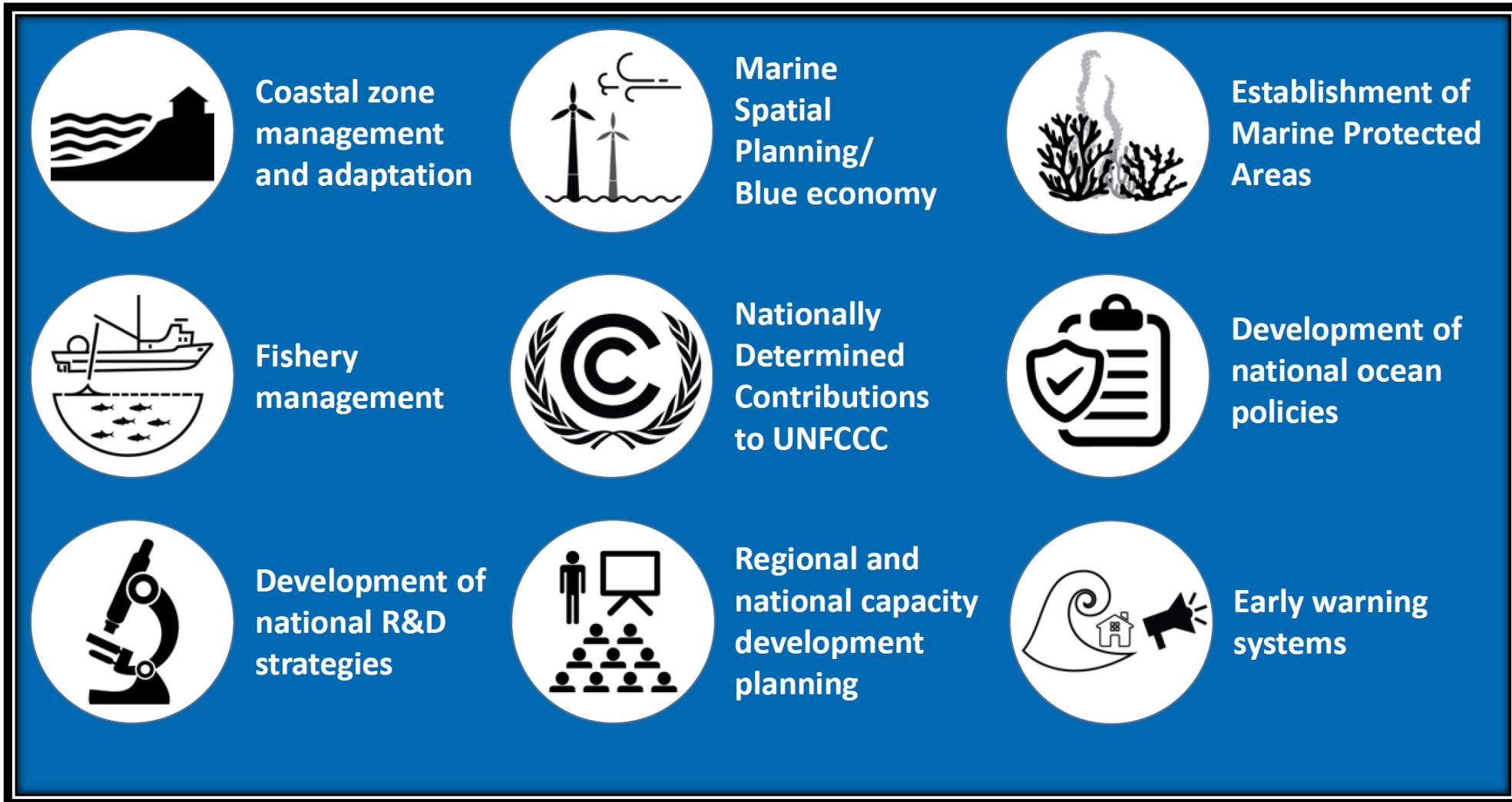
- Led by societal need (hence not all ocean science)
- Initiated as an inter-governmental process
- Transformational – different in 2030 because of Decade
- Not just labelling of science would do any way
- Roadmap – ‘top-down’ phase moving to ‘bottom up’ response

Decade Outcomes – Societally Orientated

(Articulated very like UK [and Devolved Administration shared] vision for the marine environment which is for ‘clean, healthy, safe, productive and biologically diverse oceans and seas’).

1. *A clean ocean - pollution identified, quantified, reduced, removed*
2. *A healthy and resilient ocean - ecosystems mapped, protected, multiple impacts measured reduced ecosystem services maintained*
3. *A predicted ocean - society has capacity to understand current and future ocean conditions, forecast their change and impact on human wellbeing and livelihoods*
4. *A safe ocean - human communities protected from ocean hazards and safety of operations at sea and on the coast is ensured*
5. *A sustainably harvested and productive ocean - ensuring the provision of food supply and alternative livelihoods*
6. *A transparent and accessible ocean - all nations, stakeholders citizens have access to ocean data/information, technologies have capacities to inform their decisions*

The Decade: examples of supporting national and international actions



Decade Goals

Provided the high-level motivation for the proclamation of a UN Decade of Ocean Science for Sustainable Development:

Goal 1: To generate the scientific knowledge and underpinning infrastructure and partnerships needed for sustainable development of the ocean.

Goal 2: To provide ocean science, data and information to inform policies for a well-functioning ocean in support of all Sustainable Development Goals of 2030 Agenda.

Six Decade Objectives (1)

First three define the scientific basis for the ocean we need:

Objective 1: To **generate knowledge of the ocean system**, its role in the earth and climate system, including the human component, its biodiversity and the seabed, to support sustainable management;

Objective 2: To develop and provide access to a comprehensive **evidence base and capacities for ecosystem-based management** that will improve ocean health and support a blue economy; Emphasis will be given to research on socio-economic aspects of sustainable use of the ocean, and as well as understanding and managing the effects of cumulative stressors.

Objective 3: To save lives and reduce risks from extreme events and ocean-related hazards through an accelerated programme **of research and development supporting integrated multi-hazard early warning** systems, accompanied by improved community preparedness and awareness;

Six Decade Objectives (2)

The Second three cross-cutting objectives enable and support the first three objectives:

Objective 4: To enhance ocean **observing networks, data systems and other infrastructure**, and their supporting cooperation and partnerships to service the demands of all nations by 2030;

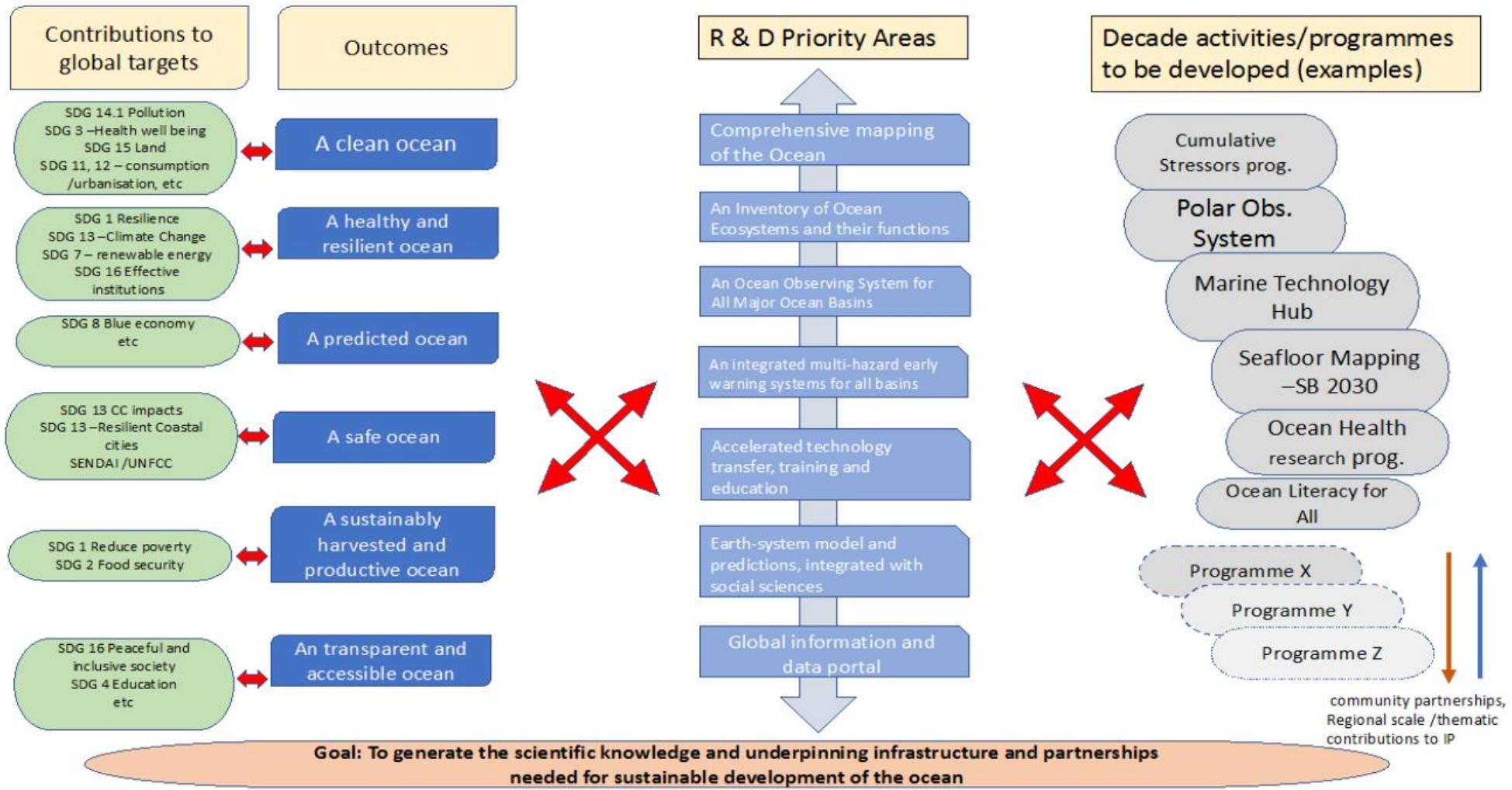
Objective 5: To transform the **scientific and technical capacity of the ocean stakeholders, especially for SIDS and LDCs**, through greater access to and more informed use of scientific knowledge and accelerated transfer of marine technology, training and education, and increased ocean literacy so that all can participate in, and benefit from, developments in ocean science and technology and its application for sustainable economic development, food production, ocean management, assessments, and responses to climate change;

Objective 6: To enhance **cooperation, coordination, and communication between stakeholders, including the private sector, in ocean science, with immediate delivery of new and existing knowledge to policy and decision-makers** in the context of the 2030 Agenda, and beyond.

Seven Research & Development Priority Areas

- **R&D Priority Area 1:** Comprehensive **map** (digital atlas) of the ocean
- **R&D Priority Area 2:** A comprehensive **ocean observing system**
- **R&D Priority Area 3:** A **quantitative understanding of ocean ecosystems** and their functioning as the basis for their management and adaptation
- **R&D Priority Area 4:** **Data** and information portal
- **R&D Priority Area 5:** Ocean dimension of integrated **multi-hazard warning system**
- **R&D Priority Area 6:** **Ocean in earth-system** observation, research and prediction, with engagement of social and human sciences and economic valuation
- **R&D Priority Area 7:** **Capacity building** and accelerated technology transfer, training and education, ocean literacy

How it fits together in the Roadmap



What could the Decade mean for the UK ?

UK and Devolved Government marine science needs ?

- **25 Year Environment Plan** (2017) - Defra led
- **Scotland's National Marine Plan** (2015)
- **Maritime 2050** (2019) - Department for Transport led
- **International Ocean Strategy** (2019) – FCO led*

Also

- Future of the Seas Foresight Report (2018) – Government Office for Science
- UK Marine Science for Sustainable and Productive Seas (2019) – MSCC*
- Science & Innovation Strategic Prospectus (2018) – UKRI
- Special Report on Oceans (2019) – IPCC* ('Because the Ocean' Declaration)
- Dasgupta Review of the Economics of Biodiversity (Announced by Chancellor, 8th April 2019)

*Publication due in 2019

Some messages from Government about marine science needs (1)

- **Inter-disciplinarity** – social, economic, natural sciences in integrated programme (not linear natural to economics to social dimensions in sequence)
- **Science for solutions** e.g. nature based solutions
- **Urgency** – imperative of decade to 2030 is key to solutions implies new research may not deliver in time. Means translation of existing research also important – what do we already know that can help inform decisions now?
- **Capacity building** – relates to transfer of marine technologies obligations (UNCLOS, Part XIV)
- **Ocean Literacy** – public confidence in ocean policies and why
- **Link to Biodiversity**
 - Nexus of Biodiversity, Climate, Ocean
 - Nature based solutions – corals, mangroves, saltmarshes (blue carbon, flood protection)
 - Biodiversity Beyond National Jurisdiction

Some messages from Government about marine science needs (2)

- **Mainstreaming Ocean in Climate**
 - UK Signed 'Because the Ocean' Declaration
 - COP25 (Chile) will be the 'Blue COP'
 - IPCC Special Report on Oceans (September 2019)
 - Nature based solutions (Blue Carbon, ecosystems moderating impacts)
- **Cumulative impacts/multiple stressors** (e.g. pollution, climate, habitat loss, overfishing, extractive impacts)
- **Better prediction of marine environment and impacts** – heatwaves, extreme events, fisheries implications
- **Gender** and marine issues (developing countries)
- Green shipping and ports (Maritime 2050)
- **Autonomous technologies**
- **Data accessibility and interoperability** (Geospatial Data Commission)

The Decade – a catalyst for change

UN DECADE OF OCEAN SCIENCE FOR SUSTAINABLE DEVELOPMENT

	Catalyst for Action within the UK	Supporting UK contribution and influence in International actions with shared agendas
Policy	<ul style="list-style-type: none"> • International Ocean Strategy Implementation • Nexus (climate, biodiversity, ocean) • Nature based climate solutions (mitigation, adaptation) • Better prediction of marine system • Cumulative impacts – climate, pollution, extraction • Marine Protected Areas • Maritime 2050 (green shipping, seabed mapping, skills) 	<ul style="list-style-type: none"> • Sustainable Development Goal 14 • BBNJ Implementing Agreement • World Ocean Assessment Regular Process • Samoa Pathway (SIDS) • Sendai Process (disaster relief) • UNFCCC (climate actions) • Regional Fisheries Management
Science-policy interface, communications	<ul style="list-style-type: none"> • Using existing knowledge (not just new research) • More inter-disciplinarity in science (social, economic, natural sciences from outset) • Science for solutions – imperative to 2030 • Ocean Literacy – public confidence 	<ul style="list-style-type: none"> • Ocean Literacy • UN Oceans coordination
Science & Technology	<ul style="list-style-type: none"> • Addressing identified policy priorities (and blue skies for long term) • Addressing key scientific knowledge gaps • Driving technological innovation for continuous ocean presence (autonomy, robotics, AI) • Driving technological innovation for data interpretation (big data analytics, machine learning, data interoperability) 	<ul style="list-style-type: none"> • R&D Priorities identified in Decade Roadmap
Science infrastructure and capability	<ul style="list-style-type: none"> • National Programme of Continuous Ocean Measurement – funding model • Next Generation Marine Science Infrastructure planned/developed (observing platforms, observations, data, technologies, genomics, bioinformatics) • Transition of models to exascale computing • Underpinning data infrastructures (seafloor maps etc) 	<ul style="list-style-type: none"> • Global Ocean Observing System – sustainable and extended from climate to biogeochemical and ecosystems (transformed by new technologies) • Digital map of the ocean floor • Genetic map of the ocean
Underpinning issues	<ul style="list-style-type: none"> • Role of UKRI in Ocean issues (cross cutting) • Geospatial data and data interoperability 	

Exploring UK interests in decade from different standpoints

UK Motivations?	Policy, Societal Benefit Perspective	Science/Policy Interface perspective	Scientific Research Perspective	Scientific Infrastructure & Capability Perspective
What does the UK want from the Decade?				
Where is UK well placed to contribute to the Decade?				
Where does UK not want to contribute to the Decade				
Where could the UK use the Decade as a catalyst for change/investment – within the UK				
Where could the UK use the Decade as a catalyst for change/investment– in UK international influence				

How is this turned into fundable and funded:
research, translational research, infrastructures, capacity building, science-policy interface activities ?

Looking at Decade R&D priorities from a UK perspective

R&D Priority Area	What would we want to transform in UK	Where can the UK contribute (lead) most effectively to an international effort
R&D 1: Comprehensive map (digital atlas) of the ocean		
R&D 2: Comprehensive map (digital atlas) of the ocean		
R&D 3: Quantitative understanding of ocean ecosystems		
R&D 4: Data and information portal		
R&D 5: Ocean dimension of integrated multi-hazard warning system		
R&D 6: Ocean in earth-system with social and human sciences and economic valuation		
R&D 7: Capacity building and accelerated technology transfer, training and education, ocean literacy		

Organisation of the Decade in the UK

- National Focal Point in Government
- UK Marine Science Coordination Committee – International Working Group
- National Oceanography Centre role (IOC link, science coordination)
- Role of other organisations – UKRI, Royal Society

Discussion



**National
Oceanography Centre**
NATIONAL ENVIRONMENT RESEARCH COUNCIL

noc.ac.uk

NERC SCIENCE OF THE
ENVIRONMENT

The Decade – a catalyst for change in the UK - what could we seek to transform?

	Policy Issues	Science/Policy Interface	Research and Technology Development	Research, Observational, & Data Infrastructures
A clean ocean	<ul style="list-style-type: none"> • Pollutants • Shipping/ports 	Emerging concerns	Impact Detection	
A healthy and resilient ocean	<ul style="list-style-type: none"> • Nexus of biodiversity, climate, ocean • Cumulative impacts • Marine Protected Areas 	Marine Assessments UK engagement	Ecosystems	Genomics Bio-informatics
A predicted ocean	Better prediction impacts	<ul style="list-style-type: none"> • Actionable information products • Role of models • Setting data requirements 	State, change/variability, attribution, prediction Climate Ecosystems Defining data needs	Infrastructural business model for ocean observing Autonomous technologies Exa-scale computing Data infrastructures
A safe ocean	<ul style="list-style-type: none"> • Flood warning • Extreme weather • Coastal erosion • Subsea infrastructures • Safe, healthy food 	<ul style="list-style-type: none"> • Natural Hazards Partnership model • Other? 	<ul style="list-style-type: none"> • Sea-level • Geo-hazards • Extreme weather • Bio-hazards 	Resilient monitoring and forecast warning systems
A sustainably harvested and productive ocean	<ul style="list-style-type: none"> • Food security • Energy security • Mineral security • Trade security 	Fisheries Environmental impacts Valuing the ocean economy satellite accounts	Valuing marine ecosystem services	Valuing the ocean economy satellite accounts
A transparent and accessible ocean	Ocean Literacy Governance – BBNJ Gender issues Capacity building	Importance of key data infrastructures for future needs	<ul style="list-style-type: none"> • Big data, machine learning, Artificial Intelligence • Human dimensions 	Seafloor maps (UK to global) Data interoperability
Underpinning Issues	<ul style="list-style-type: none"> • Improved policy coordination • Improved and consistent projection into different international fora 	<ul style="list-style-type: none"> • Using existing knowledge • Researchable questions • Geospatial data International Ocean Strategy Implementation	Role of UKRI	Next generation research infrastructures, strategic mix for UK

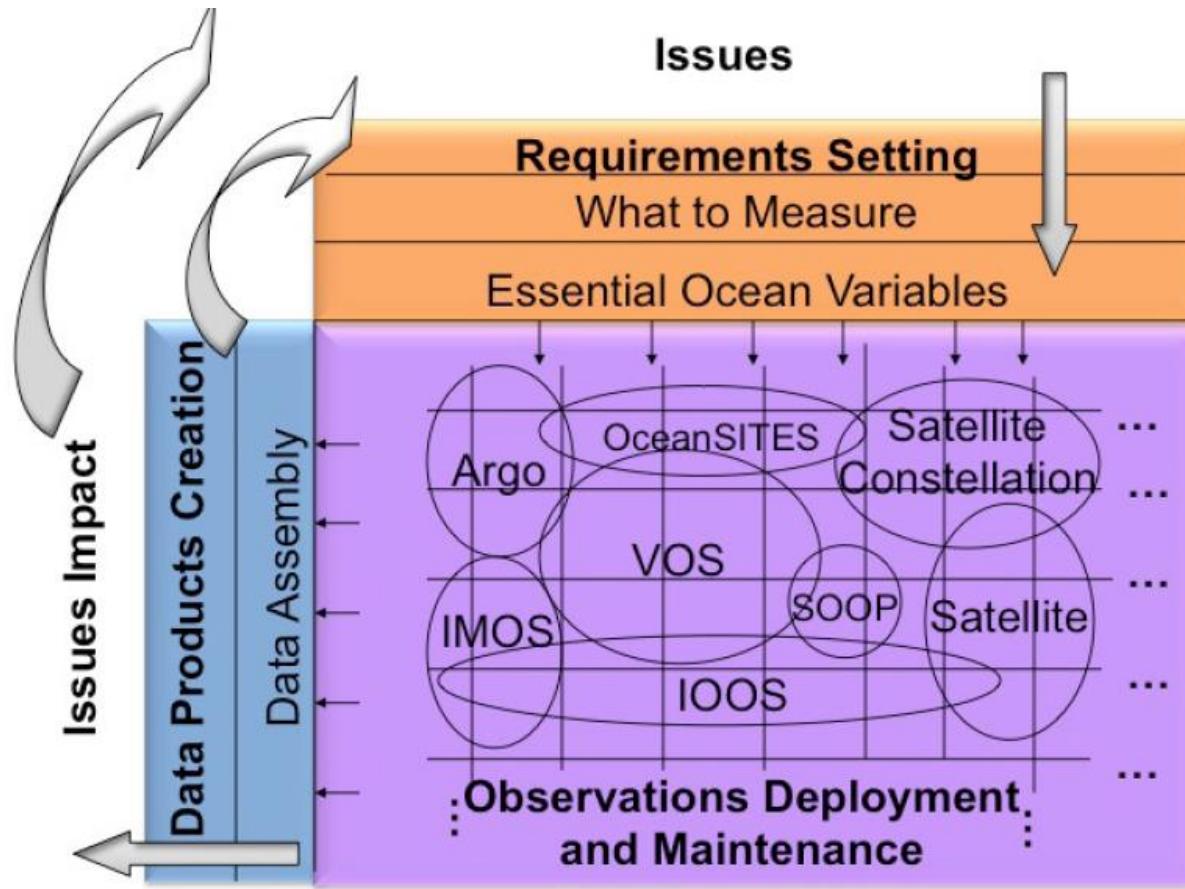


Figure 4. Structure of the Framework for Ocean Observing. How ocean observing activities fit into the systems model of the Framework. The critical feedback loop between observing system outputs and science-driven requirements is shown. (Observation system examples are illustrative only, not comprehensive.)